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Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D. C. 20554

In the Matter of )  
Advanced Television Systems )  
and Their Impact upon the )  
Existing Television Broadcast )  
Service )

MM Docket No. 87-268

JOINT BROADCASTER COMMENTS

Ninety-Six Broadcast  
Organizations

December 20, 1991

## SUMMARY

These comments are submitted on behalf of ninety-six organizations ("Broadcasters") representing broadcast licensees and networks, who join together to demonstrate their strong and unified views on certain critical issues raised in the timely and helpful Notice of Proposed Rulemaking ("Notice").

An issue of vital importance concerns the allotment and assignment of HDTV channels to local communities and stations. Broadcasters believe it is essential that specific HDTV channels be assigned to local stations at the time an HDTV standard is selected in mid-1993. Broadcasters also endorse the concept of formulating a Table of Allotments which not only allots HDTV channels to each community but also matches specific HDTV channels to the NTSC channels already listed in the Table.

Broadcasters, however, disagree with the suggestion in the Notice that HDTV channels be randomly paired with NTSC channels in a community. Broadcasters believe a far better approach is to pair HDTV and NTSC channels on the basis of current transmitter sites rather than communities. Unlike random pairing, a site-based channel-specific pairing plan would optimize HDTV allotments by maximizing HDTV coverage areas while minimizing interference to surrounding stations.

The Commission should also limit initial eligibility for HDTV channels to existing broadcast stations and permittees as of the date of the adoption of the Notice, applicants as of the date of the Notice who are ultimately

granted permits and, according to criteria set forth in the comments, vacant allotments, especially noncommercial vacant allotments. These eligibility criteria would serve the public interest and are the most practical and expedient means of introducing broadcast HDTV and avoiding disruptions of local broadcast service during the inauguration of HDTV. This approach comports fully with the Communications Act and the Ashbacker doctrine given that, among other reasons, HDTV is not being created as a new service but is a means by which to preserve and improve the existing local broadcast system.

While Broadcasters are generally supportive of the requirement that stations must apply for an HDTV channel within a three-year period, they believe the Commission should not now establish a deadline for the construction of HDTV channels but should instead revisit this issue three years after the adoption of a broadcast HDTV transmission standard. By this time, much more will be known concerning factors (which are largely or wholly beyond broadcasters' control) that will affect the implementation of HDTV, such as the cost and development of HDTV receivers and television station equipment, the availability of financing to construct HDTV facilities, and, of course, consumer demand for HDTV. Until more is known concerning these factors, it would be highly speculative, inequitable and counterproductive to impose a rigid construction deadline, including the two-year period proposed in the Notice.

It would also be premature for the Commission to establish at this time a required date by which broadcasters must convert entirely from NTSC to HDTV. It may well be appropriate to premise Commission policy on the assumption that such a conversion will at some point take place. Selecting a definitive date at this point, however, runs the risk of imposing unjustified costs on consumers and irreparable competitive damage to the local broadcast system. There are strong marketplace forces which are likely to result in a rapid and smooth transition to HDTV that protects consumer investment in NTSC receivers and leads to full conversion at the appropriate time. The Commission should at least stay its hand until some period after the broadcast transmission standard is adopted and more is known about the relevant market forces.

The Commission should take a flexible approach to the simulcasting issue raised in the Notice. At the beginning of the conversion process, broadcasters will have every incentive to maintain the quality of NTSC service, their main source of revenue during this period. It is also during this period that broadcasters should be afforded flexibility for HDTV experimentation to help ensure the success of HDTV. The Commission should monitor nationwide HDTV set penetration and the programming practices of broadcasters during the transition period and consider revisiting the simulcasting question in its discretion as that transition progresses. If some simulcasting requirement is ultimately considered, the

Commission must take into account the First Amendment and diversity concerns implicated by such content-based regulation, as well as the flexibility broadcasters will need to simulcast the same program without limiting the technological advantages offered by HDTV.

Broadcasters oppose the proposal in the Notice that would require functioning existing television stations to demonstrate their financial qualifications in applying for an HDTV channel. Such a requirement appears to be valid with respect to applicants for HDTV channels who do not have constructed, operating NTSC facilities. For existing stations in markets where there are sufficient HDTV channels for all, adoption of an appropriate site-specific channel-pairing plan, perhaps in conjunction with an appropriate "use or lose" requirement, will serve adequately to promote the expeditious introduction of broadcast HDTV.

Broadcasters firmly support the Commission's commitment to ensuring that non-commercial television stations continue playing their vital role, including the Commission's efforts to preserve vacant allotments that are presently reserved for non-commercial use and to pair HDTV channels with these channels. The Commission should also recognize that, given the budgetary constraints they face, many non-commercial stations will require more time than their commercial counterparts to commence operation of costly HDTV facilities. Broadcasters consequently urge the Commission to exempt non-

commercial stations from any application deadlines that may ultimately be deemed appropriate for commercial stations.

These joint broadcast comments also urge the Commission to take steps to address other issues raised by the Notice: (1) The Commission should initiate as soon as possible the intergovernmental coordination process with Canada and Mexico concerning the implementation of HDTV channels in border markets. (2) Many LPTV and translator stations, given their secondary status, will be displaced in major markets by the conversion of broadcast stations to HDTV. Where this does occur, Broadcasters urge the Commission to give translators priority over LPTV stations in the displacement and relocation process. (3) Broadcasters disagree with the conclusion in the Notice that no additional spectrum should be allocated for broadcast HDTV auxiliary purposes; the failure to do so will significantly limit their ability to implement HDTV, especially in major markets. (4) Given the spectrum demands in implementing HDTV, the Commission should terminate its proceeding looking to the reallocation of UHF spectrum to land mobile. (5) The Commission should give priority to adopting an HDTV system that is suitable for over-the-air broadcasting in pursuing its goal of selecting an HDTV standard that is compatible with other media. (6) The Commission must at some point address the important policy issues concerning cable carriage of HDTV channels.

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This propitious and appropriate Notice raises important policy issues. In many instances, most importantly the principles to be used in assigning HDTV channels, these are issues which should be resolved by the time a broadcast HDTV standard is adopted. Broadcasters, the vast majority of whom participated in the Petition for Notice of Inquiry, filed February 15, 1987, which triggered this rulemaking, have endeavored to achieve a broadcast-industry consensus on a number of these issues to assist the Commission in achieving their expeditious resolution. Broadcasters believe, however, that the Commission should defer definitive determination of certain other important issues until public interest judgments

can be based on some real-world experience with equipment availability, consumer response and other marketplace developments, which cannot now be foreseen but which will shape the transition to terrestrial HDTV broadcasting.

I. Spectrum Issues

A. HDTV Channels Must Be Assigned at the Same Time a Broadcast HDTV Transmission Standard Is Adopted.

Most fundamental of the issues raised in the Notice are those which concern the allotment and assignment of HDTV channels to local communities and stations. Notice at Section III. Local broadcasters remain alone among home video providers in their need for additional government-allocated spectrum to be able to deliver HDTV. Unless these HDTV channels are assigned to local broadcasters simultaneously with the selection of a broadcast HDTV transmission standard, selection of a standard will be little more than a signal to competing media that they can obtain an unfair competitive advantage. As the Commission staff has recently documented, the local broadcast system already suffers from a number of handicaps which, unless ameliorated, could impair the long-term viability of the industry. FCC Office of Plans and Policy, "Broadcast Television in a Multichannel Marketplace," 6 FCC Rcd 3996, 3999 (1991); see also Notice of Inquiry, MM Docket No. 91-221, 46 F.R. 40847 (August 16, 1991). The Commission cannot permit HDTV to become another even more

crippling disability and through this Notice it is wisely preparing to avoid such an outcome.

Optimizing specific channel allotments and assignments must, of necessity, be based in part on the unique propagation characteristics of the particular system chosen, characteristics which will not be fully understood until the completion of the testing process. The Commission has announced its intention to select a broadcast HDTV transmission standard by the second quarter of 1993. See, e.g., Statement of Thomas P. Stanley, Chief Engineer, Federal Communications Commission, Before the Subcommittee on Technology and Competitiveness of the U.S. House of Representatives, p. 2 (May 21, 1991). Broadcasters believe it is essential that specific HDTV channels be assigned to local stations at the time the standard is selected. Broadcasters commend the Commission for the timely issuance of this Notice looking towards adoption of eligibility criteria and assignment processes, thereby preserving the Commission's ability to make final HDTV channel assignments at the same time a standard is selected.

B. The Commission Should Amend the Table of Allotments to Pair Specific HDTV and NTSC Channels in a Single Step.

Broadcasters believe the Notice is on target in proposing to allot HDTV channels to each local community and to amend the Table of Allotments to reflect both NTSC and HDTV allotments. Notice at ¶ 16. More specifically, Broadcasters

strongly endorse the concept of formulating a Table of Allotments which not only allots HDTV channels to each community, but also matches specific HDTV channels to the NTSC channels already listed in the Table. As the Notice observes, such a "channel pairing" plan effectively compresses the allotment and assignment process into a single administrative step, greatly reducing the potential for regulatory gamesmanship and dilatory internecine warfare.

Broadcasters, however, disagree with the methodology proposed in the Notice where all HDTV channels would be randomly paired with NTSC channels in a community. An assignment plan that is based on purely random pairing of HDTV and NTSC channels is neither equitable nor spectrum efficient. Most fundamentally, for the reasons outlined below, it does not fulfill the basic spectrum management objective of maximizing service and minimizing interference. Broadcasters believe that a channel pairing assignment plan should be based to the greatest extent feasible on technical and engineering considerations that optimize HDTV allotments and maximize service to broadcasters' audiences. We refer to this concept throughout the rest of this pleading as "maximum HDTV coverage."<sup>1/</sup>

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<sup>1/</sup> INTV agrees that the FCC should allot new HDTV spectrum consistent with a channel pairing plan based on sound engineering principles. It reserves the right to examine the issue of coverage parity once actual engineering data are received. As a basic principle, INTV believes that the new  
(continued...)

Unlike the original NTSC Table of Allotments, the assignment of HDTV channels to existing licensees entails the squeezing of HDTV stations among existing NTSC stations. In areas of high concentration of NTSC channels and their surrounding areas, the availability of HDTV channels is very limited and critically dependent upon the precision with which channels are allotted throughout the region. Random allotment of HDTV channels to communities does not take into account the interference and preclusionary impact of these allotments on adjacent communities, creating the potential for significant inefficiencies. Moreover, even in areas where the availability of HDTV channels is not limited, random selection of HDTV channels from an available pool of channels could well fail to maximize the extent to which all licensees can provide maximum HDTV coverage while minimizing interference to surrounding stations.

The Notice reiterates that the Commission's objective in this proceeding is not to launch a new and separate service but rather to "preserve and improve existing broadcast service." Notice at ¶ 5, quoting Tentative Decision and Further Notice of Inquiry, MM Docket No. 87-268, 3 FCC Rcd 6520, 6537 (1988). Implicit in this objective should be the goals of assuring that all local stations can provide maximum

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<sup>1/</sup>(...continued)

HDTV allocations should give all stations the maximum possible coverage area.

HDTV coverage without causing interference to current areas of NTSC coverage. Given the deviations in service areas possible within the universe of channels allotted to a single community, this argues strongly for first pairing HDTV and NTSC channels on the basis of current transmitter sites rather than communities.

As the Commission is aware, NTSC channels can be allotted to a single community, yet have transmitter sites separated by as much as 80 or more kilometers.<sup>2/</sup> The service areas of such stations, while nominally encompassing the same community of license, can potentially deviate to a very significant extent. A site-specific channel pairing plan will automatically take these deviations into account. Not all stations will choose to locate their HDTV transmitters at their existing sites. Some will have tower-loading problems, at least in the short run. Others may believe their current sites are relatively inferior and choose to relocate their HDTV transmitters. Nevertheless, the majority will find it cheaper and easier to co-locate their NTSC and HDTV transmitters and a site-specific channel-pairing plan will also maximize the possibilities for doing so. This will

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<sup>2/</sup> The transmitters of stations licensed to Tucson, Arizona, for example, are all between 32 and 56 kilometers from that city's reference point and in some cases are on opposite sides of the city. In Los Angeles, one of the most congested and difficult markets, virtually all that city's stations are at least 25 kilometers from the city's reference point; a station licensed to Anaheim in the same market is 43 kilometers from that city's reference point.

reduce implementation expense and expedite the introduction of broadcast HDTV.

For the same reasons, the second option proposed in the Notice is not acceptable. Notice at ¶¶ 19-20. Under this two-step approach, HDTV channels would first be allotted to communities and then put out for application on a first-come, first-served basis in an initial filing "window", with preference "ladders" and random selection to resolve mutually exclusive selections. While the Notice theorizes that this approach would maximize the extent to which applicants' "preferences" would be accommodated, Broadcasters believe that such a filing window would encourage local stations to focus their attention on the perceived differences among the available HDTV channels, stampede some into filing improvident or speculative applications and promote, not reduce, the likelihood of challenges and delays.<sup>3</sup>

The foregoing discussion assumes that there will be sufficient spectrum even in the most congested markets to provide each existing station with an HDTV channel which will achieve maximum HDTV coverage. The validity of this assumption will not, of course, be assured until the

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<sup>3</sup> The Notice also proposes to adopt a two-part "use-it-or-lose-it" period, in which stations would have three years in which to apply for an HDTV channel and two more in which to construct it. Notice at ¶¶ 11, 14. The "first-come, first-served" approach is inconsistent with the three-year application period. In many cases, even five years will be an unreasonably short period of time and reducing the three-year application period would not seem prudent.

conclusion of the HDTV laboratory and field testing being conducted under the auspices of the Commission's ATV Advisory Committee and the Advanced Television Test Center. Should it develop that there are markets in which there is a spectrum shortage, the Notice also posits a number of alternative assignment mechanisms, including comparative preferences and lotteries. Notice at ¶¶ 24-26.

Also implicit in the Notice's analysis is the principle that the necessary additional channels will not be obtained by reducing the size of HDTV service areas below that necessary to achieve maximum HDTV coverage or by creating additional interference to NTSC channels. Broadcasters strongly endorse this principle as necessary and appropriate.

Broadcasters also agree that the pool of those eligible for HDTV channels should include permittees, applicants and unbuilt allotments, especially vacant noncommercial allotments. With respect to commercial eligibles, Broadcasters believe that, where there is a shortage of available spectrum, the Commission should, where possible, seek first to equate the number of eligibles with the number of channels available by excluding eligibles from the pool in the following order of priority: unapplied for allotments, applicants, and permittees. Thus, alternative licensee selection criteria should be employed only where it is necessary to choose among existing operating commercial stations.



Broadcasters firmly support the Commission's commitment to ensuring that non-commercial television stations continue playing their vital role in the television industry as HDTV service is introduced and eventually supplants NTSC technology. As the Commission recognized in the Notice, that commitment must be expressed in two HDTV spectrum planning policies that reaffirm the Commission's long-standing policy of reserving channels for non-commercial use. Notice at ¶¶ 27-29. First, the Commission must, as it proposes, preserve the vacant channels that are presently reserved for non-commercial use. The Commission proposes to use vacant non-commercial reservations for HDTV service only as a last resort, in exceptional cases. Broadcasters urge the Commission not to use vacant non-commercial allotments except when that is necessary, after a fact-specific study of all feasible alternatives on a case-by-case basis, for the delivery of HDTV service by an existing licensee.<sup>4</sup>

Second, given the Commission's intention that HDTV service eventually supplant NTSC service and that NTSC channels be surrendered, vacant reserved channels, like all other NTSC channels, must be paired with new HDTV channels

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<sup>4</sup> APTS and PBS believe that it is consistent with Congressional and Commission policy to preclude, even as a last resort, the use of a vacant non-commercial allotment where the allotment is necessary to provide non-commercial educational television service to a community that does not receive a Grade B non-commercial signal from a full power television station.

except when doing so would preclude the assignment of an HDTV channel to an existing broadcaster.<sup>5</sup> Without such new HDTV assignments, the presently reserved spectrum will not truly hold the promise of expanding public broadcasting service in a world where HDTV is the technological standard.

As for the technique to be used to select among mutually exclusive applications if there is a shortfall of channels, Broadcasters believe it is speculative to make a decision now in the abstract. Preliminary analyses undertaken by various broadcast organizations and by the FCC's Advisory Committee suggest that the chances that a shortfall may occur will be minimized if the systems being tested perform as they are supposed to. Notice at Appendix B. Less optimistic projections, which may underlie the issue raised in the Notice, could result from use of the proposed random assignment approach. The tailored, site-specific assignment strategy urged by Broadcasters can yield substantially greater efficiencies, which could mean the difference between having enough HDTV channels for all existing stations and not having enough.

In any event, only when it is known how great the spectrum shortfall is and where it occurs should an informed decision be made about how to assign HDTV channels when there are too few to accommodate every existing licensee.

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<sup>5</sup> All HDTV channels paired with NTSC non-commercial channels should be similarly reserved for non-commercial use.

Broadcasters emphasize, moreover, that a key factor for the Commission in choosing among rival HDTV systems must be their capability to use available spectrum efficiently enough to accommodate all existing stations.

Finally, the Notice proposes that HDTV licensees in a community be permitted to engage in post-assignment negotiation as an "economically efficient means of permitting licensees to effectuate their preferences." Notice at ¶ 21. Should the Commission adopt a channel-pairing plan, Broadcasters support this proposal for commercial stations.<sup>6</sup> Similarly, they believe that it would be desirable for the Commission to permit commercial licensees co-located at a common site to engage in pre-assignment negotiations and to promote that process by agreeing to endorse the results of those negotiations where all parties at a common site can come to a mutually acceptable solution. However, should the Commission adopt a "first-come, first-served" channel assignment process, the extent to which negotiation is permitted should be reexamined. In the context of a "first-come, first-served" process, negotiation may be counterproductive, spawning the filing of applications solely for the purpose of securing a pay-off or some other advantage.

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<sup>6</sup> Broadcasters recognize that a different policy may be appropriate for noncommercial stations.

## II. Licensing Issues

### A. The Commission Should Limit Eligibility to Existing Broadcasters.

Broadcasters also believe it essential that the Commission formally ratify the proposal put forth in the Notice to limit initial eligibility for HDTV channels to existing broadcast stations.<sup>7</sup> Notice at ¶¶ 6-8. The Notice is clearly correct in concluding not only that limiting eligibility to existing stations is the most practical and expedient means of introducing broadcast HDTV, but that it is necessary to ensure that there are no disruptions in the universal availability of local broadcast service during the transition from NTSC to HDTV.

There is no question whatsoever but that such a limitation comports fully with the requirements of the Communications Act as interpreted in Ashbacker and its progeny. This conclusion flows inevitably from the Commission's initial determination that HDTV is not being created as a new service but, rather, as a means by which to preserve and improve the existing local broadcast system. The desire for expedience and prevention of disruption is an ample

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<sup>7</sup> Broadcasters define "existing broadcast stations" to include the initial eligibles listed in the Notice: (1) all full-power television broadcast station licensees; (2) permittees authorized as of the date of adoption of the Notice; and (3) all parties with applications for a construction permit on file as of the date of adoption of the Notice who are ultimately awarded full-power television station licenses, Notice at ¶ 8, and (4) vacant allotments to the extent consistent with the discussion supra, pp. 8-10.

public interest basis for this determination. That economics will likely dictate considerable simulcasting over the two channels is further evidence of the incremental nature of broadcast HDTV. Adoption of a one-step channel-pairing plan would be further evidence of the fact that the HDTV channels are merely enhancements of the existing system. The Notice is also on solid ground in basing its determination in part upon the broadcast industry's creation of and active support for the Test Center, conduct analogous to that warranting a "pioneer's preference".<sup>8</sup>

Moreover, in all but a number of the largest markets, HDTV channels will likely be available for new applicants, even if every existing station should apply in a timely fashion to construct its HDTV facility. In instances where there are more than enough HDTV channels to accommodate existing stations, applications should be opened to all qualified applicants. And, of course, all of those who are eligible but fail to apply in the initial priority stage should be permitted to apply for any channels which subsequently remain available.

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<sup>8</sup> Broadcasters also agree that application of the duopoly prohibition and national multiple ownership limitations to "paired" HDTV and NTSC facilities would be nonsensical. Notice at ¶ 9.

B.    The Date of the 'Notice' is an Appropriate  
Cut-off Date for Eligibility.

Broadcasters support the proposal in the Notice to limit eligibility to licensees, permittees and applicants whose applications have been accepted for filing as of the date of the Notice and who are ultimately granted permits. Notice at ¶ 8. It may also be possible to permit as eligibles both petitioners for changes in the Table of Allotments and applicants requesting waivers of the current freeze. However, this should be done only to the extent the Commission can determine that grants of such petitions and/or applications will not reduce the number of available HDTV channels below that necessary to accommodate all existing stations or to provide HDTV service areas at least as extensive as current coverage areas.

In any event, it is essential that the Commission at some point "freeze", at least for purposes of optimizing HDTV allotments, the pool and locations of existing transmitters.<sup>9</sup> The date of the Notice would appear to be an appropriate point of reference.

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<sup>9</sup>    The Commission may wish to establish a limited exception for new NTSC non-commercial stations to service areas not yet receiving any non-commercial service. If any such exception is established, the HDTV assignments for such stations should be premised on the coordinates of their allotments as of the date of the Notice. It may be that while other stations also would be permitted to relocate their transmitters during this period, their HDTV assignments would be premised on their locations as of the date of the Notice.

C. The Use-or-Lose Period Should Be Made More Flexible.

To expedite delivery of HDTV service, the Notice proposes to give existing broadcasters a three-year "priority" period in which to file their initial HDTV applications after which their channels would be opened to the public at large. Notice at ¶ 11. The Notice also proposes to extend to HDTV construction permits the two-year construction period currently applied to NTSC construction permits. Notice at ¶ 14. HDTV construction permits not built within the two-year period would be forfeited; extensions of time would not be granted for lack of finances or economic conditions. Coupled with the proposed three-year application period, the proposed construction period and application policy appears to establish an immutable five-year "use or lose" limitation on HDTV assignments.<sup>10</sup>

The Commission's desire to expedite the introduction of a broadcast HDTV system and to prevent "warehousing" of HDTV channels is salutary. With respect to commercial

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<sup>10</sup> As noted earlier, the proposal to "pool" all HDTV channels in a given community and make them available for assignment on a "first-come, first-served" basis, Notice at ¶ 19, would be inconsistent with the three-year application period wherever there are multiple HDTV channels allotted to a community and there are perceived differences in attractiveness among those channels. Conversely, stations in markets where only one channel is allotted would have no pressure to apply prior to the expiration of the full three-year period. The Notice does not articulate, nor can Broadcasters conceive of, any public interest rationale for discriminating among markets in this fashion.

stations, Broadcasters are, therefore, generally supportive of the requirement that stations must apply within three years of the final adoption of a standard in order to capitalize on their assignment preference. Circumstances might develop that would call for the general or case-by-case extension of this three-year period, but as an initial matter, three years appears to be an appropriate target period to require the filing of applications for HDTV channels assigned to existing licensees.

However, rigid application of the current two-year NTSC construction period to the construction of HDTV channels would not be "logical," fair nor in the public interest. It is not logical because the two-year construction requirement for NTSC channels assumes a mature transmission equipment industry, a 98% NTSC penetration level and a web of established services and other support industries. None of these exists in the case of HDTV. HDTV is much more akin to the case of DBS where the Commission initially provided six years for DBS permittees to begin operations. Interim Authorization of DBS, Gen. Docket No. 80-603, 90 FCC2d 676, ¶ 114 (1982). Nearly ten years later, the first DBS System remains at least two years from launch. See Communications Daily, June 4, 1991, at 1-2.

A two-year construction requirement would not be fair because the broadcasters' ability to construct HDTV facilities is only partially within their own control. A



necessary first step is the widespread availability of suitable, reasonably-priced transmission and other HDTV equipment.<sup>11</sup> As the Notice implicitly acknowledges, both the availability and the initial price of such equipment will be dependent in significant part upon the patent licensing policy adopted by the winning system proponent. Notice at ¶ 42. Even if the proponents commit in advance to universal licensing, some period of time will be required for manufacturers to establish production lines. It is highly questionable that the manufacturing industry for this equipment is currently capable of achieving this goal within five years.<sup>12</sup>

A second prerequisite for the HDTV implementation process, also not within broadcasters' control, is the development of a high-volume, reasonably priced receiver market. The receiver industry will, of course, respond to consumer demand, but until the standard to be adopted is known, receiver manufacturers cannot proceed very far, let alone solve critical manufacturing problems or estimate retail prices. Consumer demand is a somewhat independent variable as

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<sup>11</sup> Very expensive prototype equipment is obviously not a suitable basis for requiring the entire industry to convert to HDTV.

<sup>12</sup> Of the five HDTV systems now being evaluated by the FCC's ATV Advisory Committee through the Advanced Television Test Center, none has commercially available terrestrial transmission equipment and only NHK's Narrow MUSE system has available non-prototype production and transmission (DBS) equipment.